

# Evaluation of climate policy measures over two decades finds many have failed to achieve necessary emissions reductions

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An international research team has unveiled the first comprehensive global evaluation of 1,500 climate policy measures from 41 countries

across six continents.

[Published](#) in the journal *Science*, this study provides a detailed impact analysis of the wide range of climate [policy](#) measures implemented over the last two decades. The findings reveal a sobering reality: many policy measures have failed to achieve the necessary scale of emissions reductions.

Only 63 cases of successful climate policies, each leading to average emission reductions of 19%, were identified. The key characteristic of these successful cases is the inclusion of tax and price incentives in well-designed policy mixes.

Much of the debate about climate policy centers on which climate policy instruments work in reducing emissions, and which do not. Yet prior evaluations have focused on a limited range of headline policies, neglecting hundreds of other measures.

This new study, led by researchers at the Potsdam Institute for Climate Impact Research (PIK) and the Mercator Research Institute on Global Commons and Climate Change (MCC) in collaboration with experts from the University of Oxford, the University of Victoria, and the Organization for Economic Co-operation and Development (OECD), aims to fill this gap.

An accompanying interactive website, the "Climate Policy Explorer," offers a comprehensive overview of the results, analysis and methods, and is available to the public.

"We systematically evaluated policy measures that have rarely been studied until now, providing new insights into well-designed combinations of complementary policy instruments. From this, we derive [best practices](#)—for the building, electricity, industry and transport

sectors, and in both [industrialized countries](#) and often neglected developing countries," explains lead author Nicolas Koch from PIK and MCC.

"Our findings demonstrate that more policies do not necessarily equate to better outcomes. Instead, the right mix of measures is crucial. For example, subsidies or regulations alone are insufficient; only in combination with price-based instruments, such as carbon and energy taxes, can they deliver substantial emission reductions."

The study highlights specific examples to illustrate this point. For instance, the researchers show that bans on [coal-fired power plants](#) or combustion engine cars do not result in major emissions reductions when implemented alone. Successful cases only arise in tandem with tax or price incentives, as shown in the UK for coal-fired power generation or in Norway for cars.

## **In-depth analysis of 1,500 policy measures and 63 success stories**

The researchers evaluated 1,500 policy interventions implemented between 1998 and 2022, covering the entire spectrum of climate policy instruments, from energy-related building codes to purchase subsidies for climate-friendly products, and carbon taxes.

Using a new OECD database, which represents the most comprehensive inventory of climate policies worldwide to date, and an innovative approach combining machine learning methods with established statistical analyses, the team conducted a detailed impact evaluation of these policies, identifying those measures that achieved large-scale emissions reductions.

"While it remains challenging to precisely disentangle the effects of individual measures within a policy mix, our 63 success cases provide systematic insights into effective policy combinations, and show how well-designed policy mixes depend on sectors and the development level of countries," notes lead author Annika Stechemesser from PIK.

"This knowledge is vital for supporting policymakers and society in the transition to climate neutrality."

## Climate policy explorer: A comprehensive resource

The interactive Climate Policy Explorer offers detailed insights into specific countries, sectors, and policy measures. In the [industrial sector](#), for example, China's pilot emissions trading systems significantly reduced emissions after a few years, complemented by reduced fossil fuel subsidies and stronger financing incentives for energy efficiency.

In the electricity sector, the UK achieved major emissions reductions through a minimum carbon price, subsidies for renewable energy, and a coal phase-out plan.

The US is an example of significant emission reductions in the transportation sector, resulting from a mix of tax incentives and subsidies for low-emitting vehicles and CO<sub>2</sub> efficiency standards. Germany's eco-tax reform and truck toll introduction is another notable success story in the transport sector.

**More information:** Annika Stechemesser et al, Climate policies that achieved major emission reductions: Global evidence from two decades, *Science* (2024). [DOI: 10.1126/science.adl6547](https://doi.org/10.1126/science.adl6547).  
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Provided by Potsdam Institute for Climate Impact Research

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